Venn Diagram, Cooperative Learning and Reading Comprehension Skills Acquisition among Pupils with Attention Deficit Hyperactivity Disorder in Akwa Ibom North West District

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DOI: https://doi.org/10.51244/IJRSI.2025.120500115

Received: 20 April 2025; Accepted: 29 April 2025; Published: 14 June 2025

ABSTRACT

The study investigated the effect of Venn Diagram and Cooperative Learning on Reading Comprehension Skills Acquisition among Pupils with Attention Deficit Hyperactivity Disorder in Akwa Ibom North West District". In order to achieve this purpose, eight objectives, and hypotheses were formulated to guide the study. Quasi-experimental design, specifically, the non-randomized pretest and post-test control group was adopted for the study. The population of the study comprised all the 5,817 primary three pupils with ADHD in all the 410 public primary schools in Akwa Ibom North West Senatorial District, as at 2024/2025 academic session. A sample size of 66 pupils with ADHD from 12 intact classes was used for the study. A multistage sampling technique was adopted to obtain a representative sample for the study. Four instruments were used in this study namely Teacher Nomination Checklist (TNC), Attention Deficit Hyperactivity Disorder Diagnostic Checklist (ADHDDC) by APA (2013), Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-IV) and Pupils Reading Comprehension Skills Acquisition Test (PRCSAT). Kuder Richardson formula 21(K-P21) was used to estimate the reliability Coefficient of Pupils' Reading Comprehension Acquisition Test (PRCAT) which yielded reliability coefficient index of 0.93. Cronbachs Alpha statistic was used to estimate the reliability Coefficient of ADHDDC, DSM-IV and TNC which yielded reliability coefficient indices of 0.85, 0.88 and 0.87 respectively. ANCOVA was used to test the hypotheses at 0.05 level of significance. The result of the analysis revealed among others that there is a significant difference in pupils' ability to understand story element of comprehension passage, make sequence of events, find main idea, compare, understand cause of event, make inference and make conclusion when exposed to Venn diagram, cooperative learning strategies and the conventional rote learning. Based on the findings and conclusion of the study, it was recommended among others, that teachers should incorporate diverse instructional strategies, such as Venn diagrams and cooperative learning, to meet the unique needs of pupils with attention deficit hyperactivity disorders (ADHD).

Keywords: Venn Diagram, Cooperative Learning, Reading Comprehension, Attention Deficit Hyperactivity Disorder

INTRODUCTION

Children begin to understand text long before they are able to read. When parents, teachers or significant others read a picture book to the child and he sees the picture, listen the words as they are read, the child begins to associate the words on the book and the words they are hearing with the picture they see and make meaning of the idea the picture presents. Comprehension indeed is an important aspect of reading. Whenever one reads, effort is being made to understand and extract meaning for better overall awareness of what is read. In the light of the foregoing Herrity (2023) stated that reading comprehension is the ability to understand what is been read. It is therefore an intentional and active part of reading which can take place before, during and after reading exercise. When a reader is able to understand the text, it is only then that

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

meaning can be extracted from the text and better realize what the author tries to convey. According to Herrity (2023) there are two components of reading comprehension namely, text comprehension and vocabulary knowledge. Vocabulary knowledge is the ability to understand the language being used while text comprehension is the ability to use language to develop an awareness of the meaning behind the text.

Acquisition of reading comprehension skills is very important for many reasons. It has many benefits for the primary school pupils. Ability to read effectively and understand what is read can improve both personal and professional life of an individual. It can improve and increase the overall enjoyment of reading. Ability to understand a written material surely helps to boost the reader's knowledge in certain areas and help to learn new skills and information faster (Low, 2019). To excel in all school subjects, pupils must possess ability to read and comprehend texts, read with an understanding and ability to express meaning into what they read. Reading comprehension therefore, is a crucial learning skill for all children. In the light of this Ruiz (2015) opined that reading comprehension as an indispensable language skill is fundamental to every aspect of literacy. It can be likened to a window through which a literate person can view the world; far beyond his reach. Reading is interesting and exciting to primary school pupils. When children are able to read they do so with so much joy that, most times they do not give attention to understanding what they read. Such pupils read words in isolation, read word by word as if counting the words in the sentence and so on. This form of reading makes comprehension difficult if not entirely impossible.

The main essence of reading as it were is to make sense of what is being read. One can only make sense of what is read when the individual possesses adequate comprehension skills. Hence comprehension is an integral part of reading; a third language art skill essential for learning and successful progress through school. So, reading comprehension is an indispensable language skill, which children at school need to be adequately equipped with in order to excel in academics. Reading comprehension requires considerable level of concentration, close attention and thinking. The Rend Reading Study Group (2015) viewed reading comprehension as a process of simultaneously extracting and constructing meaning through interaction and involvement with written language. The group explained understanding word meaning; analyze the author's point of view, and aim for writing; and gaining knowledge of new words, is all very important reading skill, which supports reading comprehension. Thus, children need reading comprehension skills such as ability to understand story elements, make sequence of events, find main idea, compare and contrast, make inference, understand cause and effect, and make conclusions.

According to Atmowardoyo (2018), another reading comprehension skill needed by primary school pupils is the ability to find the main idea in a text or passage. The main idea in passage is the central message expressed in the passage by the author. Sometimes it could be directly expressed but at sometimes it might be applied. It therefore, behoves on the reader to be able to find it while reading. Palencia (2016) opined that finding the main idea in a passage comes seamlessly as a result of comprehension. The main idea may be found at the beginning paragraph, the first sentence often explains the subject of focus in the text. It is important that pupils be taught to use various clues in a passage along with maps, diagrams, sketches and pictures to find the main idea in a passage.

These reading comprehension skills seem to elude many pupils in primary schools for various reasons which researchers over the years have tried to remediate. The set of pupils who seem to be most vulnerable when it has to do with reading comprehension are pupils with Attention Deficit Hyperactivity Disorders (ADHD). This category of pupils have severe difficulty acquiring reading comprehension perhaps due to their inability to pay attention, sit still and concentrate during comprehension exercises in class. Gat, Gray and Single (2015) observed that inattention; hyperactivity, and impulsiveness are the core conditions of the attention deficit hyperactivity disorder (ADHD) in children. Reading comprehension can be very challenging for many children. It is particularly challenging for children with attention deficit hyperactivity disorders (ADHD). In order to understand a reading material the child must be able to recognize and decode words as well as sustain attention and effort (Miranda et al., 2017). Children with ADHD have difficulty in the area of effective use of working memory, information processing in an efficient manner, which are necessary

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

requirement for ability to comprehend. As a result children with ADHD have deficit in reading comprehension. Moreover reading itself is a complex cognitive activity that is difficult for children with disabilities.

Denton, Tamm, Schatschneider & Epstein (2019) opined that while research showed that treatment of ADHD is of paramount importance in improving reading comprehension skills there are other strategies with which students can improve reading comprehension. Research effort overtime had been geared towards the improvement of reading comprehension of students with attention deficit hyperactivity disorder (ADHD). Researchers have recommended strategies such as minimize outside distractions during reading time (Betker, 2017) and preferred reading environment while some students do better reading in quiet places, others prefer "white noise" such as background sounds or music while reading, allowing the students to read in chunks of time, taking breaks to move around and refocus, teaching studying has to use a bookmark to keep their place on the page, slide the bookmark down the page one line at a time, helping students break down reading material, into shorter segment so it is not overwhelming for the student (Low, 2019).

A child's academic success is often dependent on his or her ability to comprehend texts, therefore, needs structured instruction to be able to attend to tasks and classroom instructions, with minimal distraction. It is important that the classroom condition and atmosphere be made conducive for pupils with attention deficit hyperactivity disorder to achieve reading comprehension with which to make reasonable progress in school. To do that one point of consideration is the instructional strategies teachers employ in the classroom. This study therefore examines two instructional strategies that could make reading comprehension fun fill for pupils with attention deficit hyperactivity disorders namely: Venn Diagram instructional strategy and the cooperative learning instructional strategy (Kurniati et al., 2023).

Venn Diagram instructional strategy has been used in the field of sciences, mathematics and social sciences and has been found to improve students learning. Venn Diagrams strategies of illustrating, and organizing key concepts in reading comprehension by comparing and contrasting two or more elements; determining the differences and relationships shard by the elements. Thus, pupils can use Venn Diagrams to show relationships among two sets of elements, or groups (Qi-Jacque, 2017). The study of Paul (2018), reveals for years, Venn Diagrams have been suggested in general and special education strategies textbooks as strategies to use in teaching ADHD children, as it could aid the understanding of the ADHD children in real content information. This study intends to examine the Venn Diagram strategy in improving the reading comprehension of pupils with attention deficit hyperactivity disorders (ADHD). Venn Diagram instructional strategy is a pupils friendly, attention sustaining and fun fill learning strategy. Venn Diagram instructional strategy is used to visually represent the differences and the similarities between two concepts. Venn Diagrams are also called logic or set diagrams and have been widely used in set theory, logic, mathematics, business, teaching sentence structures, computer science and statistics.

Venn Diagram is defined as a diagram that helps learner to visualize the logical relationship between sets and their elements and to solve problems based on these sets. Venn Diagram is an illustration that uses circles to show the relationships among things or infinite group of things (Kenton, Drury, & Timothy, 2022). Venn Diagrams have long been recognized for their usefulness as educational toils. It is useful for illustrating how different concepts or factors intersect with one another. It shows at a glance how things are similar or different and where and how they overlap (Venn, 2019). The second instructional strategy for making reading comprehension acquisition fun for pupils with ADHD is the cooperative learning strategy. One instructional strategy that can enhance understanding and retention is cooperative learning strategy (Osei & Twumasi, 2018).

In the opinion of Antonio & Antonio (2015) it is a successful instructional strategy in which small groups, each with students of diverse ability levels use variety of learning activities to improve student learning experiences. Indeed cooperative learning strategy houses a variety of educational approaches involving joint intellectual efforts by students or students and teachers together. It requires a small number of pupils to work

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

together to improve their reading comprehension through interdependence and cooperation with one another to maximize their own, and each other's learning. In cooperative learning pupils tend to use strategies such as, "think-pair-share, where the teacher asks the pulps' to think about the topic, pair with a partner to discuss, and share ideas with the group.

Furthermore, an important factor for consideration in the research work is whether the poor reading comprehension of pupils' with ADHD is more prevalence in boy than the girls, as Kenneth & Michel (2018) suggested that boys are more likely to be affected of ADHD than the girls, as boys tend to have more difficulty focusing on class works than girls because of their inattention. Quack (2018) dispels the myth that ADHD condition takes different dimensions on boys and girls; yet they do not differ in terms of skill acquisition. Thus, in this study it will be necessary to find out which of the instructional strategies work best for both boys and girls, as no two children with ADHD, are alike. Although several researchers working with children with attention deficit hyperactivity disorder (ADHD) have postulated several mode of remediation to be less effective with ADHD and academic performance of individuals who manifest this characteristics (Nwachukwu, & Ogunshola, 2019).

In spite of all these research contributions, reading comprehension still seems to constitute a huge barrier to pupils with attention deficit hyperactivity disorders (ADHD). This study therefore sought to investigate strategies that would make reading comprehension fun for pupils with attention deficit hyperactivity disorders. It is on the promise that this group of pupils is easily distracted; have difficulty sitting still, unable to sustain attention for a considerable period of time and so on. If learning is enabled to be fun for pupils with ADHD, it will make them active participants in classroom instructions (Hume, Allen, & Lonigan, 2015). When reading instruction is fun fill pupils with attention deficit hyperactivity disorder many gain maximally in reading comprehension. It is on this premise therefore that this study deemed it necessary to examine the effect of Venn Diagram and cooperative learning instructional strategies on the reading comprehension acquisition of pupils with attention deficit hyperactivity disorders in Akwa Ibom North-West Senatorial District.

Statement of the Problem

Ability to read is one thing and ability to understand what is read is another. When pupils read without understanding (comprehension), the meaning and message of the passage is lost. Pupils are therefore not able to answer questions emanating from the passage, they are unable to make references, identity the main idea and make summary of passage. Most primary school pupils show a gross deficit in reading comprehension. The situation is worse with pupils who manifest attention deficit hyperactivity disorder (ADHD) as a result of their inattention, inability to sit still and focus, they easily loose out in reading exercise and consequently unable to gain comprehension leading to poor performance in reading comprehension and other school subjects. The poor performance of pupils with ADHD, in reading comprehension has been attributed to unforeseen circumstances; such as genetics, and inherited traits. Still others believe that ADHD problems stem from poor economic background of children.

Educators have attributed problem of poor performance of pupils with ADHD to several factors. Researcher who worked with children with attention deficit hyperactivity disorder found factors such as inappropriate instructional materials, lack of children friendly environment, teacher's lack of requisite knowledge of appropriate instructional procedure and so on. Efforts have also been made overtime to remediate this problem. However, in spite of research efforts in the past the problem of reading comprehension deficiency still persist among primary school pupils with attention deficit hyperactivity disorders It is on this promise that this study sought to make acquisition of reading comprehension fun for pupils with attention deficit hyperactivity disorders by examining two instruction strategies – Venn Diagram and cooperative learning strategies. The study therefore sought to provide answers to questions such as what is the difference in reading comprehension between pupils taught using Venn Diagram, cooperative learning instructional strategies and the conventional method of instruction (CMI) (rad aloud) teaching reading comprehension.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Purpose of the Study

The purpose of this study was to investigate the effect of Venn Diagram and cooperative learning instructional strategies on reading comprehension skills acquisition of pupils with Attention Deficit Hyperactivity Disorder (ADHD) in Akwa Ibom North West Senatorial District. Specifically, the study sought to determine the:

1. Difference in the ability of pupils with ADHD to understand story element of comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).
2. Difference in the ability of pupils to make sequence of events in comprehension passage when exposed to Venn Diagram, cooperative learning instructional strategies and the conventional method of instruction (CMI) (read aloud).
3. Difference in the ability of pupils with ADHD to find main idea of comprehension when exposed to Venn Diagram, cooperative learning instructional strategies and the conventional method of instruction (CMI) (read aloud).
4. Difference in the ability of pupils with ADHD to compare in comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).
5. Difference in the ability of pupils with ADHD to understand cause of event on reading comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).
6. Difference in the ability of pupils with ADHD to make inference from a comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).
7. Difference in the ability of pupils with ADHD to make conclusion when exposed to Venn Diagram, cooperative learning strategies and conventional method of instruction (CMI) (read aloud).
8. Difference in the comprehension ability of male and female pupils with ADHD when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Research Hypotheses

The following null hypotheses were postulated to guide the study and tested at 0.05 level of significance.

H_{01}: There is no significant difference in the ability of pupils with ADHD to understand story element of comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

H_{02}: There is no significant difference in the ability of pupils to make sequence of events in comprehension passage when exposed to Venn Diagram, cooperative learning instructional strategies and the conventional method of instruction (CMI) (read aloud).

H_{03}: There is no significant difference in the ability of pupils with ADHD to find main idea of comprehension when exposed to Venn Diagram, cooperative learning instructional strategies and the conventional method of instruction (CMI) (read aloud).

H_{04}: There is no significant difference in the ability of pupils with ADHD to compare in comprehension passage when exposed to Venn Diagram, cooperative learning strategies and conventional method of instruction (CMI) (read aloud).

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

H_{05}: There is no significant difference in the ability of pupils with ADHD to understand cause of event on reading comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

H_{06}: There is no significant difference in the ability of pupils with ADHD to make inference from a comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

H_{07}: There is no significant difference in the ability of pupils with ADHD to make conclusion when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

H_{08}: There is no significant difference in the comprehension ability of male and female pupils with ADHD when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Scope of the Study

The study was delimited to investigation of Venn Diagram, Cooperative Learning and Reading Comprehension Skills Acquisition among Pupils with Attention Deficit Hyperactivity Disorder in Akwa Ibom North West District. Also, for using the primary three children for this were because the age they are is an expressive age; whereby the children are not even conscious of their own behaviour. Hence, act strangely; between ages seven to eight; thus at this stage begins to display their individual personal characteristics, this age bracket falls into primary three.

METHODOLOGY

The study adopted quasi-experimental design. The non-randomized pretest and post-test control group was used for the study. The structure is as shown below:

Experimental group1	E_1	O_1	X_1	O_2
Experimental group2	E_2	O_3	X_2	O_4
Control group	C	O_5	C	O_6

where O_1, O_3 and O_5 represent pretest observation for experimental groups 1, 2 and the control group respectively. Similarly O_2, O_4 and O_6 represent the posttest observation for experimental groups 1, 2 and the control group. While X_1 represents the treatment (Venn Diagram) for experimental group1 and X_2 represents the treatment (Cooperative Learning) for experimental group 2 and C represents the control group (Conventional Method of Instruction (CMI) (read aloud).

This study was conducted in Akwa Ibom North-West senatorial district. It is one of the three senatorial districts in Akwa Ibom State. The area is located within the 7^0 North and longitudes $7^0$15 and $9^0$30 East (MOE, 2017). The North of the area is bounded by Abia State.

The population of the study comprised all the 5,817 primary three pupils with ADHD in all the 410 public primary schools in Akwa Ibom North West Senatorial District, as at 2024/2025 academic session (State Universal Basic Education, SUBEB, 2024). A sample size of 66 pupils with ADHD from 12 intact classes was used for the study.

Four instruments were used in the study. They include attention deficit hyperactivity disorder checklist (ADHDC) by APA (2013); Teacher Confirmation Checklist (TCC); Diagnostic and Statistical Manual of

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Mental Disorders, (5th Edition DSM-V), and Pupils Reading Comprehension Skills Acquisition Test (PRCSAT). To ensure face and content validity of the instruments, the instruments were subjected to validity by three research experts.

To ascertain the reliability of the instruments for the study, the instruments were subjected to pilot testing on 20 pupils with ADHD outside the study area which have the same characteristics but were not part of the main study. Kuder Richardson formula 21($K\text{-}P_{21}$) was used to estimate the reliability Coefficient of Pupils' Reading Comprehension Acquisition Test (PRCAT) which yielded reliability coefficient index of 0.93. Cronbachs Alpha statistic was used to estimate the reliability Coefficient of ADHDDC, DSM-IV and TCC which yielded reliability coefficient indices of 0.85, 0.88 and 0.87 respectively. This indicated that the instruments were reliable and suitable for the study. The data collected were analyzed in line with each research hypothesis. Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 level of significance. The pretest scores were used as covariates to the posttest scores.

RESULTS AND DISCUSSION

Hypothesis One

There is no significant difference in pupils' ability to understand story element of comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Table 1: Result of Analysis of Covariance (ANCOVA) of the significant difference in pupils' ability to understand story element of comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	581.849[a]	3	193.950	39.473	.000
Intercept	818.588	1	818.588	166.601	.000
Pretest	45.915	1	45.915	9.345	.003
Instructional Strategies	440.135	2	220.068	44.789	.000
Error	304.635	62	4.913		
Total	3688.000	66			
Corrected Total	886.485	65			
a. R Squared = .656 (Adjusted R Squared = .640)					

Source: Field Data (2024).

Data presented in Table 1 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to understand story element of comprehension passage. F = 44.789, P = .000. This is because the F-value of 44.789, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in pupils' ability to understand story element of comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .640 suggests further that 64% of total variance on the dependent measure was contributed by the treatment condition.

Hypothesis Two

There is no significant difference in pupils' ability to make sequence of events in comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Table 2: Result of Analysis of Covariance (ANCOVA) of the significant difference in pupils' ability to make sequence of events in comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	475.882[a]	3	158.627	29.521	.000
Intercept	723.379	1	723.379	134.623	.000
Pretest	128.506	1	128.506	23.915	.000
Instructional Strategies	311.471	2	155.736	28.983	.000
Error	333.149	62	5.373		
Total	3020.000	66			
Corrected Total	809.030	65			
a. R Squared = .588 (Adjusted R Squared = .568)					

Source: Field Data (2024).

Data presented in Table 2 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to understand story element of comprehension passage. F = 28.983, P = .000. This is because the F-value of 28.983, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in pupils' ability to make sequence of events in comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .568 suggests further that 56.8% of total variance on the dependent measure was contributed by the treatment condition.

Hypothesis Three

There is no significant difference in pupils' ability to find main idea of comprehension when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Table 3: Result of Analysis of Covariance (ANCOVA) of the significant difference in pupils' ability to find main idea of comprehension when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	306.392[a]	3	102.131	13.229	.000
Intercept	817.116	1	817.116	105.844	.000
Pretest	12.635	1	12.635	1.637	.206
Instructional Strategies	276.155	2	138.077	17.886	.000
Error	478.638	62	7.720		
Total	2996.000	66			
Corrected Total	785.030	65			
a. R Squared = .390 (Adjusted R Squared = .361)					

Source: Field Data (2024).

Data presented in Table 3 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to find main idea of comprehension. F = 17.886, P = .000. This is because the F-value of 17.886, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in pupils' ability to find main idea of comprehension when exposed Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .361 suggests further that 36.1% of total variance on the dependent measure was contributed by the treatment condition.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Hypothesis Four

There is no significant difference in pupils' ability to compare in comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Table 4: Result of Analysis of Covariance (ANCOVA) of the significant difference in pupils' ability to compare in comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	404.005[a]	3	134.668	21.987	.000
Intercept	1107.356	1	1107.356	180.792	.000
Pretest	3.236	1	3.236	.528	.470
Instructional Strategies	399.292	2	199.646	32.595	.000
Error	379.752	62	6.125		
Total	3112.000	66			
Corrected Total	783.758	65			
a. R Squared = .515 (Adjusted R Squared = .492)					

Source: Field Data (2024).

Data presented in Table 4 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to find main idea of comprehension. F = 32.595, P = .000. This is because the F-value of 32.595, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in pupils' ability to compare in comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .492 suggests further that 49.2% of total variance on the dependent measure was contributed by the treatment condition.

Hypothesis Five

There is no significant difference in pupils' ability to understand cause of event on reading comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Table 5: Result of Analysis of Covariance (ANCOVA) of the significant difference in pupils' ability to understand cause of event on reading comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	319.537[a]	3	106.512	14.496	.000
Intercept	780.726	1	780.726	106.255	.000
Pretest	72.480	1	72.480	9.864	.003
Instructional Strategies	224.985	2	112.492	15.310	.000
Error	455.554	62	7.348		
Total	2940.000	66			
Corrected Total	775.091	65			
a. R Squared = .412 (Adjusted R Squared = .384)					

Source: Field Data (2024).

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Data presented in Table 5 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to understand cause of event on reading comprehension passage. F = 15.310, P = .000. This is because the F-value of 15.310, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in pupils' ability to understand cause of event on reading comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .384 suggests further that 38.4% of total variance on the dependent measure was contributed by the treatment condition.

Hypothesis Six

There is no significant difference in pupils' ability to make inference from comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Table 6: Result of Analysis of Covariance (ANCOVA) of the significant difference in pupils' ability to make inference from comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	413.813[a]	3	137.938	19.232	.000
Intercept	794.358	1	794.358	110.756	.000
Pretest	96.180	1	96.180	13.410	.001
Instructional Strategies	316.203	2	158.101	22.044	.000
Error	444.672	62	7.172		
Total	3356.000	66			
Corrected Total	858.485	65			
a. R Squared = .482 (Adjusted R Squared = .457)					

Source: Field Data (2024).

Data presented in Table 6 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to make inference from comprehension passage. F = 22.044, P = .000. This is because the F-value of 22.044, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in pupils' ability to make inference from comprehension passage when exposed Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .457 suggests further that 45.7% of total variance on the dependent measure was contributed by the treatment condition.

Hypothesis Seven

There is no significant difference in pupils' ability to make conclusion when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Table 7: Result of Analysis of Covariance (ANCOVA) of the significant difference in pupils' ability to make conclusion when exposed Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud)

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	415.089[a]	3	138.363	30.097	.000
Intercept	971.716	1	971.716	211.367	.000
Pretest	80.919	1	80.919	17.601	.000

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Instructional Strategies	288.491	2	144.246	31.376	.000
Error	285.033	62	4.597		
Total	3272.000	66			
Corrected Total	700.121	65			
a. R Squared = .593 (Adjusted R Squared = .573)					

Source: Field Data (2024).

Data presented in Table 7 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to make conclusion. F = 31.376, P = .000. This is because the F-value of 31.376, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in pupils' ability to make conclusion when exposed Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .573 suggests further that 57.3% of total variance on the dependent measure was contributed by the treatment condition.

Hypothesis Eight

There is no significant difference in comprehension ability of male and female pupils with attention deficit hyperactivity disorders when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction (CMI) (read aloud).

Table 8: Result of Analysis of Covariance (ANCOVA) of the significant difference in comprehension ability of male and female pupils with attention deficit hyperactivity disorders when exposed to Venn Diagram, cooperative learning strategies and the conventional method

Source	**Type III Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Corrected Model	19395.985[a]	6	3232.664	56.857	.000
Intercept	12932.576	1	12932.576	227.462	.000
Pretest	2257.814	1	2257.814	39.711	.000
Gender	14560.902	5	2912.180	51.220	.000
Error	3354.500	59	56.856		
Total	140016.000	66			
Corrected Total	22750.485	65			
a. R Squared = .853 (Adjusted R Squared = .838)					

Source: Field Data (2024).

Data presented in Table 8 show that treatments as main factors had a significant effects on the mean scores of pupils' ability to make conclusion. F = 51.220, P = .000. This is because the F-value of 51.220, which is significant at .000 probability level and also significant at 0.05 level of significance. This also shows that the hypothesis of no significant difference in comprehension ability of male and female pupils with attention deficit hyperactivity disorders when exposed to Venn Diagram, cooperative learning strategies and the conventional method is rejected. The adjusted R squared of .838 suggests further that 83.3% of total variance on the dependent measure was contributed by the treatment condition.

MAJOR FINDINGS

1. There was a significant difference in pupils' ability to compare in comprehension passage when exposed to Venn Diagram, cooperative learning strategies and conventional method of instruction.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

2. Venn Diagram and Cooperative Learning strategies were significantly more effective than conventional method of instruction in enhancing pupils' understanding of cause-and-effect relationships in reading comprehension, with substantially larger effect sizes of 1.51 and 1.41.
3. There was a significant difference in pupils' ability to understand cause of event on reading comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction.
4. Venn Diagram and Cooperative Learning strategies showed significantly greater improvements in pupils' ability to make inferences from comprehension passages, with large effect sizes (2.51 and 1.62), compared to the minimal improvement and small effect size (0.30) of the Conventional method of instruction, indicating that Venn Diagram and Cooperative Learning are more effective instructional strategies.
5. There was a significant difference in the ability of pupils to make inference from comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction.
6. Venn Diagram and Cooperative Learning strategies outperformed Conventional method of instruction in enhancing pupils' conclusion-making skills, with notably larger effect sizes (1.79 and 1.17 versus 0.29), highlighting their superiority as instructional approaches.
7. There was a significant difference in pupils' ability to make conclusion when exposed to Venn Diagram, cooperative learning strategies and conventional method of instruction.
8. There was a significant difference in comprehension ability of male and female pupils with attention deficit hyperactivity disorders when exposed to Venn Diagram, cooperative learning strategies and the conventional method of instruction.

DISCUSSION OF FINDINGS

Effect of Instructional Strategies on Pupils' Ability to Understand Story Element of Comprehension Passage

The findings with respect to hypothesis one revealed that Venn Diagram and Cooperative Learning strategies significantly improved pupils' understanding of story elements in comprehension passages, with large effect sizes, whereas Conventional method showed minimal improvement. The interactive and engaging nature of Venn Diagrams and Cooperative Learning, which promote visual organization, collaborative discussion, and shared learning, contributed to their effectiveness. In contrast, Conventional method's passive approach led to lower engagement and retention, making it less effective. The finding of this study is consistent with prior research of Boyle (2016) who found that students who used Venn Diagrams showed significant gains in literal and relational comprehension.

Effect of Instructional Strategies on Pupils' Ability to Make Sequence of Events in Comprehension Passage

The findings revealed that Venn Diagram and Cooperative Learning strategies showed significant improvements in pupils' ability to sequence events in comprehension passages, with large effect sizes, whereas the Conventional method showed a decline in performance with a small negative effect size. The results also showed a significant difference in pupils' ability to sequence events when exposed to Venn Diagram, Cooperative Learning, and Conventional method. A follow-up Post-hoc Scheffe test revealed significant mean differences between Venn Diagram and Conventional method, and Cooperative Learning and Conventional method. However, no significant mean difference was found between Venn Diagram and Cooperative Learning.t mean difference was observed between Cooperative Learning and Conventional method of instruction which is line with findings of Siregar (2018) and Nofa (2018) who found that students who used Venn Diagrams demonstrated substantial gains in reading comprehension, with notable differences between pre- and post-test scores.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Effect of Instructional Strategies on Pupils' Ability to Find Main Idea of Comprehension

The summary of data analysis for hypothesis three indicated a significant difference in pupils' ability to find main idea of comprehension when exposed to Venn Diagram, cooperative learning instructional strategies and the conventional method. This could be attributed to the fact that Venn Diagram and Cooperative Learning foster active learning, critical thinking, and collaboration, ultimately leading to improved comprehension and retention of main ideas. This findings align with previous research on the effectiveness of various instructional strategies on reading comprehension. Novianty (2019) found that concept mapping and Venn Diagrams had different effects on reading comprehension achievement, with a significant difference between the two groups. Similarly, this study suggests that the strategy used can impact reading comprehension outcomes.

Effect of Instructional Strategies on Pupils' Ability to Compare in Comprehension Passage

The findings obtained in hypothesis revealed that there was a significant difference in pupils' ability to compare in comprehension passage when exposed to Venn Diagram, cooperative learning strategies and conventional method. This finding is in conformity with the finding of Susanto (2021) who found that Venn Diagrams can improve students' understanding of reading descriptive texts.

Effect of Instructional Strategies on Pupils' Ability to Understand Cause of Event on Reading Comprehension Passage

The summary of data analysis for hypothesis five indicated a significant difference in pupils' ability to understand cause of event on reading comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method. The above finding is in line with Akpochimora (2018) who reported that there was a significant difference between the mean achievement scores of students taught chemistry with cooperative learning instructional strategy and those taught using lecture method.

Effect of Instructional Strategies on Pupils' Ability to Make Inference from Comprehension Passage

Hypothesis six revealed that there was a significant difference in the ability of pupils to make inference from comprehension passage when exposed to Venn Diagram, cooperative learning strategies and the conventional method. This implies that Venn Diagrams and Cooperative Learning are more effective instructional approaches, as they promote critical thinking, connection-making, and deeper understanding of texts, whereas Conventional method's focus on memorization and repetition yields minimal improvement in inference-making skills. The finding of this study is in accordance with earlier finding of Alhassan (2019) who finding that significant difference existed between the mean score on academic performance and the attitude scores of NCE Social Studies students taught using cooperative learning approach and those taught with conventional method of instruction.

Effect of Instructional Strategies on Pupils' Ability to Make Conclusion

The findings with respect to hypothesis seven indicated a significant difference in pupils' ability to make conclusion when exposed to Venn Diagram, cooperative learning strategies and conventional method. This finding is in accordance with Malasari and Eni (2017) who investigated the use of Venn Diagram technique for teaching descriptive text reading and discovered that the student's achievement in reading comprehension got significantly improved.

Effect of Instructional Strategies on Comprehension Ability of Male and Female Pupils with Attention Deficit Hyperactivity Disorders

Summary of the analysis of hypothesis eight revealed that males with attention deficit hyperactivity disorders (ADHD) outperformed females in comprehension ability when using Venn Diagram and Cooperative Learning strategies, whereas the Conventional method showed minimal improvement for both genders.

ISSN No. 2321-2705 | DOI: 10.51244/IJRSI |Volume XII Issue V May 2025

Additionally, there was a significant difference in comprehension ability between male and female pupils with ADHD when exposed to Venn Diagram, Cooperative Learning, and Conventional method. This finding is true because males with ADHD responded better to Venn Diagrams and Cooperative Learning may be due to the interactive and engaging nature of these strategies, which can help alleviate symptoms of ADHD such as inattention and hyperactivity. This is corroborated by Imam (2016) who found that, there was significant difference between the performance of male and female students exposed to Critical thinking instructional strategies and those not exposed to treatment.

CONCLUSION

On the basis of the findings in this study, it is concluded that Venn Diagrams, cooperative learning strategies, and conventional method have varying effects on pupils' comprehension abilities, particularly for those with attention deficit hyperactivity disorders (ADHD). This finding suggests that teachers should consider incorporating diverse instructional strategies to meet the unique needs of pupils with ADHD. The significant differences found in the comprehension abilities of male and female pupils with ADHD when exposed to these different learning strategies highlight the need for invidualised instructional approaches. This implies that teachers should be aware of the individual differences and learning styles of their pupils, and adapt their teaching methods accordingly. By doing so, teachers can provide a more inclusive and effective learning environment for pupils with ADHD.

The findings of this study also underscore the importance of moving beyond traditional teaching methods, such as conventional method, and incorporating more interactive and engaging strategies, like Venn Diagrams and cooperative learning. These approaches can help pupils with ADHD stay focused and motivated, leading to improved comprehension and academic outcomes.

RECOMMENDATIONS

Based on the findings and the conclusion of this study, the following recommendations are made:

1. Teachers should incorporate diverse instructional strategies, such as Venn Diagrams and cooperative learning, to meet the unique needs of pupils with attention deficit hyperactivity disorders (ADHD).
2. Teachers should move beyond traditional teaching methods, such as conventional method, and focus on more interactive and pupil-centered approaches.
3. Teachers should be aware of the individual differences and learning styles of their pupils with ADHD and provide extra support and accommodations as needed.
4. Schools should provide professional development opportunities for teachers on teaching pupils with ADHD, including the use of diverse instructional strategies and accommodations.
5. Teachers should consider the specific needs and strengths of pupils with ADHD when designing instructional strategies and provide opportunities for pupils to engage in challenging and complex tasks.
6. Parents and teachers should work collaboratively to provide a supportive and inclusive learning environment for pupils with ADHD.
7. Further research should be conducted to explore the effectiveness of different instructional strategies for pupils with ADHD and to identify best practices for teaching this population.
8. Policy makers should consider providing additional resources and support for schools to provide specialized instruction and accommodations for pupils with ADHD.

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